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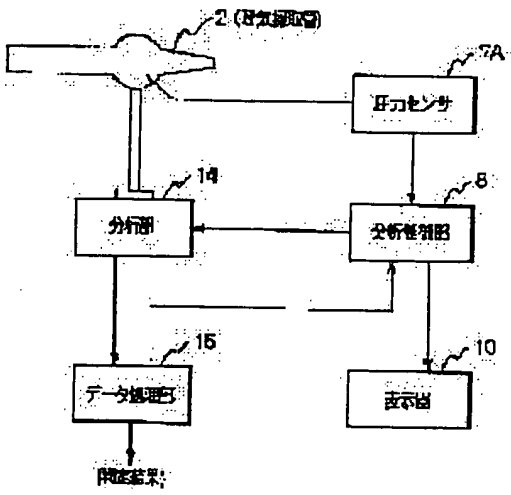
(54) BREATH SAMPLING AND ANALYZING APPARATUS

(57)Abstract:

PURPOSE: To display a breath component analyzing state and a breath emitting state to output both states to the outside.

CONSTITUTION: A breath sampling and analyzing apparatus is equipped with a breath sampling pipe 2 having a breath suction port, an analyzing part 14 detecting a component to be examined from a predetermined amt. of the breath sampled by the breath sampling pipe 2, a data processing means 15 receiving the component detection signal from the analyzing part 14 for the definite time corresponding to the component to be examained and calculating the concn. of the component in the breath on the basis of the component detection signal and an analyzing control part 8 controlling the operation timings of the data processing means 15 and the analyzing part 14 on the basis of a predetermined start signal. A breath emission sensor 7A (pressure sensor) detecting the flow of the breath into the breath sampling pipe to output a start signal and a display device 10 emitting or putting out lights according to a predetermined display changeover signal are provided on the analyzing control part 8. The analyzing control part 8 has function outputting the display changeover signal to the display device 10 on the basis of the start signal and function outputting the display changeover signal to the display device 10 after the elapse of the definite time corresponding to the component to be examined.



CLAIMS

[Claim 1] Exhalation extraction tubing which has exhalation blowing-in opening, and the analyzor which detects a component to be examined from the exhalation of the specified quantity extracted with this exhalation extraction tubing, The data-processing [signal / from this analyzor / component detection] means according to a component to be examined which computes the constituent concentration concerned in said exhalation based on the component detection signal concerned while carrying out fixed time amount reception, In the exhalation extraction analysis apparatus equipped with the analysis control section which controls this data-processing means and the timing of said analyzor of operation based on a predetermined start signal The exhalation regurgitation sensing sensor which detects the inflow of the exhalation into said exhalation extraction tubing to said analysis control section, and outputs a start signal to it, The function in which puts side by side the drop turned on or switched off according to a predetermined display change signal, and said analysis control section outputs the 1st display change signal to said drop based on said start signal, The exhalation extraction analysis apparatus characterized by having the function which outputs said 2nd display change signal at said drop after the fixed passage of time according to said component to be examined.
[Claim 2] The exhalation extraction analysis apparatus according to claim 1 characterized by having the alphabetic character panel by which said drop gives the external notice of said analyzor being working.
[Claim 3] Said drop is equipped with the time amount display which carries out the display output of the time amount concerned based on a predetermined hour entry. The timer which clocks the time amount after said start signal reception is put side by side to said analysis control section. The function in which said analysis control section computes the residual time about said fixed time amount to which said component detection signal is outputted based on the elapsed time information outputted from said timer, and which was defined beforehand, The exhalation extraction analysis apparatus according to claim 1 or 2 characterized by having the latency-time display function which outputs the residual time information concerned to said drop.
DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001] [Industrial Application] This invention relates to an exhalation extraction analysis apparatus, and relates to the exhalation extraction analysis apparatus which displays an analysis situation especially.
[0002] [Description of the Prior Art] The exhalation extraction analysis apparatus which analyzes by extracting a test subject's exhalation is developed as indicated by the former, for example, JP,6-58919,A. The exhalation extraction analysis apparatus is used for the monitor of the breath analysis for clinical laboratory tests in the medical field, and a patient's symptoms. Moreover, it is used for measurement of work environment, or measurement of indoor environment in the industrial field. On the other hand, in the police field, it is used for control and narcotics control of drunken driving, and is used in wide range fields, such as fire-causes investigation in the fire-fighting field, and health care in the health industry field.
[0003] This exhalation extraction analysis apparatus is equipped with exhalation extraction tubing with which it was attached to the body of equipment and by which the

periphery section was covered at the heater, two carrier gas passage respectively connected to the edge of this exhalation extraction tubing through the four-way-type electro-magnetic valve, the air bomb connected to this four-way-type electro-magnetic valve, and the sample metering zone which divided a part of each carrier gas passage, and was prepared.

[0004] and the three way each electro-magnetic valve which the downstream of each sample metering zone was equipped with the pump for exhalation installation (suction pump) connected through the Mikata electro-magnetic valve and the exhaust pipe, and was mentioned above -- each juxtaposition -- and it has two separation columns mutually connected independently.

[0005] While the exhalation breathed out to exhalation extraction tubing will be discharged with the pump for exhalation installation in the equipment exterior if a test subject does the regurgitation of the exhalation inside exhalation extraction tubing when analyzing by extracting exhalation from a test subject, each sample metering zone is filled with a part of exhalation as an exhalation sample. Subsequently, an exhalation sample is separated by the difference in the holding time of each component gas after the exhalation sample it is [sample] full of each metering zone will be sent into each separation column, if carrier gas was sent into each sample metering zone from the air bomb. Then, breath analysis is performed by predetermined data processing.

[0006] [Problem(s) to be Solved by the Invention] However, in this conventional example, by an operator etc., a test subject starts the regurgitation of exhalation, verbally in response to the fact that "directions of the exhalation regurgitation."

[0007] On the other hand, the operator could not but check by the screen display of a data processing machine to check analysis actuation (preparation O.K. during analysis) etc. For this reason, it always needed to stand by during analysis around the analysis apparatus.

[0008] Furthermore, unless the test subject who is standing by inspection went into the inspection interior of a room etc., he was not able to judge whether it had to wait for whether it is in the condition which can be inspected.

[0009] Moreover, according to a component to be examined and analysis conditions, in 3 minutes to 20 minutes, analysis time amount becomes settled in a 40-minute about room, when extreme. For this reason, it cannot respond in the timer of fixed time amount. Therefore, the operator needed to stand by around the data processing machine.

[0010] [Objects of the Invention] This invention improves the technical problem which the starting conventional example has, and sets it as the purpose to offer the exhalation extraction analysis apparatus which can carry out the display output of being in the condition in which under analysis of an exhalation component and the exhalation regurgitation are possible outside especially.

[0011] [Means for Solving the Problem] Then, exhalation extraction tubing which has exhalation blowing-in opening as the 1st means in this invention, The analyzor which detects a component to be examined from the exhalation of the specified quantity extracted with this exhalation extraction tubing, The data-processing [signal / from this analyzor / component detection] means according to a component to be examined which computes the constituent concentration concerned in exhalation based on the component detection signal concerned while carrying out fixed time amount reception, It has the analysis control section which controls this data-processing means and the timing of the

analyzor of operation based on a predetermined start signal. And the exhalation regurgitation sensing sensor which detects the inflow of the exhalation into exhalation extraction tubing to an analysis control section, and outputs a start signal to it, and the drop turned on or switched off according to a predetermined display change signal are put side by side. Furthermore, the analysis control section has taken the configuration of having had the function which outputs the 1st display change signal to a drop when an exhalation installation signal is outputted to the analyzor based on a start signal, and the function which outputs the 2nd display change signal at a drop after the fixed passage of time according to a component to be examined.

[0012] As the 2nd means, the drop has taken the configuration of having had the alphabetic character panel which gives the external notice of the analyzor being working.

[0013] It has the time amount display to which a drop carries out the display output of the time amount concerned as the 3rd means based on a predetermined hour entry. The timer which clocks the time amount after start signal reception is put side by side to an analysis control section. Further The configuration of having had the function in which an analysis control section computes the residual time about fixed time amount to which a component detection signal is outputted based on the elapsed time information outputted from the timer, and which was defined beforehand, and the latency-time display function which outputs the residual time information concerned to a drop is taken.

[0014] In this invention, these means tend to attain the purpose mentioned above.

[0015] [Function] If a test subject does the regurgitation of the exhalation to exhalation extraction tubing, an exhalation regurgitation sensing sensor will detect the inflow of the exhalation into exhalation extraction tubing, and will output a start signal. For example, a start signal is outputted, when the pressure inside exhalation extraction tubing is detected and a pressure rises more than fixed. Furthermore, an analysis control section makes component detection processing of the analyzor start based on the start signal concerned.

[0016] Moreover, an analysis control section outputs a display change signal to a drop, when a start signal is received. Then, a drop is turned on or switched off according to this display change signal. A drop indicates by external that it is under analysis by this lighting or putting out lights.

[0017] Furthermore, the analyzor detects a component to be examined from the exhalation of the specified quantity, and outputs a component detection signal to a data-processing means. A fixed time amount [detection / this / component] line crack according to a component to be examined, therefore a component detection signal are outputted to the fixed time data processing means concerned. With a data-processing means, the constituent concentration concerned in the extracted exhalation concerned is computed based on this component detection signal.

[0018] An analysis control section outputs a display change signal to a drop, when fixed time amount according to a component to be examined passes. Then, the light is switched on the light or put out according to this display change signal, and a drop indicates by external that the regurgitation of the next test subject's exhalation is possible.

[0019] When a drop is the configuration equipped with the alphabetic character panel which gives the external notice of the analyzor being working, the purport which is under analysis is indicated by external by lighting or putting out lights of a panel the alphabetic character was indicated to be.

[0020] [Example] Next, one example of this invention is explained with reference to a

drawing.
[0021] Drawing 1 is the block diagram showing the configuration of the exhalation extraction analysis apparatus by this invention. The exhalation extraction tubing 2 with which an exhalation extraction analysis apparatus has exhalation blowing-in opening, and the analyzor 14 which detects a component to be examined from the exhalation of the specified quantity extracted with this exhalation extraction tubing 2, The data-processing [signal / from this analyzor 14 / component detection] means 15 according to a component to be examined which computes the constituent concentration concerned in exhalation based on the component detection signal concerned while carrying out fixed time amount reception, It has the analysis control section 8 which controls this data-processing means 15 and the timing of the analyzor 14 of operation based on a predetermined start signal.
[0022] And exhalation regurgitation sensing sensor 7A (pressure sensor) which detects the inflow of the exhalation into exhalation extraction tubing to the analysis control section 8, and outputs a start signal to it, and the drop 10 turned on or switched off according to a predetermined display change signal are put side by side. Moreover, the timer which clocks the time amount from reception of a start signal serially is put side by side to the analysis control section 8.
[0023] Furthermore, the analysis control section 8 is equipped with the function which outputs the 1st display change signal to a drop 10 based on a start signal, and the function which outputs the 2nd display change signal at a drop 10 after the fixed passage of time according to a component to be examined.
[0024] This is explained to a detail.
[0025] The exhalation extraction tubing 2 carries out constant-rate are recording of the exhalation breathed out by the test subject. Pressure-sensor 7A and flow rate sensor 7B are connected, and the rise of the pressure in the exhalation extraction tubing 2 by the regurgitation of the exhalation from a test subject is caught, and a pressure sensor 7 outputs a start signal to this exhalation extraction tubing 2, when the pressure more than a constant pressure is detected.
[0026] The sampling pump 9 which attracts the exhalation in exhalation extraction tubing constitutes the exhalation installation means 9.
[0027] Moreover, flow rate sensor 7B which is not illustrated is put side by side in the exhalation extraction tubing 2. A flow rate sensor catches the flow rate in 7B and the exhalation extraction tubing 2, and exhalation discharge quantity is computed in integrating the flow rate concerned. Here, the mass flowmeter or the hot wire current meter is used as flow rate sensor 7B. Since it is what detects the amount of exhalation required for component detection, the mass flowmeter which is not influenced of thermal expansion is desirable. Moreover, in the case of a hot wire current meter, since exhalation is heat and high humidity comparatively, that to which the moisture in exhalation may adhere to a heat ray, and coating of the heat ray is carried out for this reason is desirable [exhalation].
[0028] The analyzor 14 consists of a separation column 21 which separates each component by the difference in the holding time of the component gas in the extracted exhalation, and component detector 14A which detects the existence of the component to be examined in the separation column 21. Component detector 14A is outputting component detection signal 14a to the data-processing section 15 serially. This

component detection signal 14a is set to the voltage level corresponding to the detected component when existence of an object component is detected.
[0029] The data-processing section 15 computes the concentration of the component concerned in area conversion based on component detection signal 14a and the calibration curve which becomes settled beforehand by the component to be examined. This data-processing section 15 starts the analysis of the component detection signal 18 based on the start signal from the analysis control section 8, and continues the analysis of this component detection signal 18 fixed time beforehand set by the component to be examined and the exhalation sample. The data-processing section 15 ends the analysis of component detection signal 14a after fixed time amount progress of 3 to about 20 minutes.
[0030] The analysis control section 8 starts the analyzor 14 and the data-processing section 15 based on a start signal from pressure-sensor 7A. Moreover, when this start signal is received, or when it is judged with the regurgitation of required exhalation having been completed with a flow rate sensor output, the 1st display change signal is outputted to a drop 10.
[0031] Moreover, when fixed time amount of the component detection processing by analysis control-section 8 analyzor 14 is completed (i.e., when the time of delivery of component detection signal 14a of the data-processing section 15 defined beforehand is completed), the 2nd display change signal is outputted to a drop 10. Moreover, when the calculation of the concentration of a component to be examined based on component detection signal 14a is completed, you may make it output a display change signal to a drop 10 from the data-processing section 15. Furthermore, when the analyzor 14 needs to be purged and it changes into the condition that a purge is completed and the next test subject's exhalation can be analyzed, you may make it output this display change signal.
[0032] Furthermore, in this example, the analysis control section 8 integrates a flow rate based on a flow rate sensor output, and treats this as exhalation discharge quantity. Moreover, the various display controls of a drop 10 are performed based on this exhalation discharge quantity.
[0033] A drop 10 indicates by external whether it is waiting and the regurgitation of under analytic activation or the exhalation by the test subject is possible based on the 1st [from the analysis control section 8], or 2nd display change signal.
[0034] Moreover, you may make it a drop 10 also display the exhalation discharge quantity breathed out by the test subject. This is [0035] which is what displays the purport which the regurgitation of exhalation completed when the discharge quantity of the exhalation by the test subject resulted in the specified quantity required for breath analysis beforehand. Drawing 2 thru/or drawing 3 are the front views showing the appearance of a drop 10. A drop is equipped with the alphabetic character panel 10 A which shows what this equipment is analyzing and which it described "is under inspection" when alphabetic character panel 10A which shows that this equipment is waiting to a test subject when the 2nd display change signal is received and which it described "Can inspect", and the 1st display change signal receive, as shown in drawing 2 (A). The light is switched on with the lamp of the drop 10 interior, and these are switched off. This lighting or putting out lights is performed by the display change signal inputted from the analysis control section 8.
[0036] Alphabetic character panel 10A shown in this drawing 2 is a thing for test

subjects. For this reason, you may make it display the message which you may make it install in the waiting room, and stimulates the regurgitation of exhalation. For example, you may make it describe a message, such as "please blow in into inhalation opening."
[0037] On the other hand, alphabetic character panel 10B shown in drawing 3 is a thing for operators. For this reason, it is what indicated by simple.
[0038] Drawing 4 shows an example of the drop in the case of displaying the latency time during analysis actuation. The drop 10 is equipped with time amount display 10C which carries out the display output of the time amount concerned based on a predetermined hour entry with the configuration which displays this latency time.
[0039] And it has the function in which the analysis control section 8 computes the residual time about fixed time amount to which component detection signal 14a is outputted based on the elapsed time information outputted from the timer, and which was defined beforehand, and the latency-time display function which outputs the residual time information concerned to a drop 10.
[0040] For this reason, in the example shown in this drawing 4 , the latency time to the inspection initiation by the next test subject can be displayed.
[0041] Next, the detail of an exhalation extraction analysis apparatus mentioned above is explained.
[0042] Drawing 5 is the block diagram which indicated the detail of an exhalation extraction analysis apparatus shown in drawing 1 . As shown in drawing 5 , the exhalation extraction tubing 2 is constituted from cylinder-like exhalation inflow section 2a, spherical exhalation reservoir section 2b, and exhalation discharge section 2c in which the taper was formed so that a bore might become small gradually towards a point by one. 2d of edges of exhalation inflow section 2a is equipped with the disposable mouthpiece 1 by which sterilization processing was carried out.
[0043] Furthermore, opening of the edge of exhalation discharge section 2c is carried out, and this opening is equipped with flow rate sensor 7B. Moreover, pressure-sensor 7A which senses the pressure in this exhalation extraction tubing 2, and the exhalation installation tubing 4 which introduces into the analyzor 14 the exhalation accumulated into the exhalation extraction tubing 2 concerned are connected to exhalation reservoir section 2b.
[0044] In the exhalation extraction tubing 2 and the exhalation installation tubing 4, it is maintained by predetermined temperature at the heater 3 for exhalation extraction tubing, and the heater 5 for exhalation installation tubing, respectively. This is for preventing that the breathed-out exhalation component and moisture adhere to the internal surface of exhalation extraction tubing 2 grade. Temperature control of each [these] heaters 3 and 5 is carried out by heater 6 controller.
[0045] The analyzor 14 is equipped with the thermostat 13 which maintains the separation column 21 grade which separates an exhalation component to predetermined temperature, and component detector 14A which detects the existence of the component to be examined in this separation column 21, and outputs component detection signal 14a to the data-processing section.
[0046] constant temperature -- with the sample loop formation 19 which accumulates temporarily the exhalation extracted with the exhalation extraction tubing 2 into a layer 13 The precolumn 20 which introduces hydrocarbons, such as ethane which holds polar components, such as moisture contained in the exhalation introduced from this sample

loop formation 19, and serves as a subject of examination, to a separation column, The separation column 21 which separates a component to be examined from the exhalation component introduced from this precolumn 20 based on the difference in the holding time of each component gas is equipped.

[0047] Moreover, the pump 9 for a sampling which attracts the exhalation accumulated in the exhalation extraction tubing 2 to the sample loop formation 19 is put side by side to the thermostat 13.

[0048] Conveyance of the exhalation from the sample loop formation 19 to each columns 20 and 21 is taken as the configuration which energizes the flow of exhalation with carrier gas by this example. This carrier gas is introduced into 19, 20, and 21, such as each column, from a carrier chemical cylinder. Maintenance and installation of the pressure of this carrier gas are controlled by carrier gas controller 21A.

[0049] This carrier gas controller 12A is performing not only conveyance of exhalation but control of scavenging air (purge) of the exhalation in the sample loop formation 19, each column 20, and 21 in this example. Furthermore, carrier gas controller 12A is also performing purge control of the path from the exhalation installation tubing 4 to the sample loop formation 19. In order to perform conveyance or a purge of this exhalation, it is necessary to change the path of carrier gas. In this example, the sampling bulb 17 and the Mikata change solenoid valve 40 are performing this change.

[0050] It is open for free passage through the sampling bulb 17 in the sample loop formation 19, each columns 20 and 21, and the exhalation installation tubing 4. The sampling bulb 17 is having port (1) - (10) and changing the connection condition between this port, as shown in drawing 6 . While conveying the exhalation accumulated in the exhalation extraction tubing 2 to the sample loop formation 19, the 1st mode of operation (refer to drawing 8) which purges separation column 21 grade, and the 2nd mode of operation (refer to drawing 9) which conveys the exhalation accumulated in the sample loop formation 19 in each columns 20 and 21 are realized.

[0051] Moreover, as shown in drawing 7 , the purge of the exhalation installation tubing 4 is performed by introducing the purge gas stored by the purge gas reservoir section 42 into the connection section 40 which connects the exhalation extraction tubing 2 and the exhalation installation tubing 4. The Mikata change solenoid valve which changes three ports of the exhalation extraction tubing 2, the exhalation installation tubing 4, and the purge gas installation tubing 41 that conveys purge gas constitutes this connection section 40 from this example. The Mikata solenoid valve 40 connects the exhalation extraction tubing 2 and the exhalation installation tubing 4 according to the control from the analysis control section 8, and makes the exhalation installation tubing 4 and the purge gas installation tubing 41 open for free passage. The example in the case of purging between the sample loop formations 19 from the exhalation installation tubing 4 is shown in drawing 10 .

[0052] Drawing 11 indicates the sequence diagram for the timing control of each part of operation by the outline. The analysis control section 8 turns ON the pump 9 for a sampling by the input of the push switch which tells the regurgitation of exhalation with a start signal or hand control so that it may illustrate (RY 501).

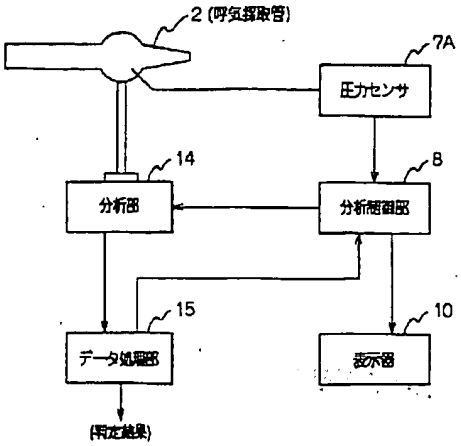
[0053] Furthermore, only the time amount set as Timer RY T000 operates the pump 9 for a sampling, inhales the exhalation of the exhalation extraction tubing 2 to the sample loop formation 19, suspends the pump 9 for a sampling after this setup-time progress, and

makes only time amount set as Timer RY T002 the 1st mode of operation. Moreover, a display change signal is outputted to a drop 10 at this time (RY 503).
[0054] Furthermore, when the time amount set as Timer RY T001 is completed, only the time amount set as Timer RY T002 is changed, and let the sampling bulb 17 be the 2nd mode of operation. Furthermore, the analysis start signal of component detecting-signal 14a is outputted to the data-processing section 15 (RY 507). In response, a display change signal is outputted from the data-processing section 15 (RY508).
[0055] Drawing 12 is a flow chart which shows the example of operation according to the sequence diagram shown in drawing 11 in a configuration of having been shown in drawing 5 .
[0056] When the body of equipment is in an analysis standby condition, the display for test subjects displays the message which shows that the regurgitation of exhalation is possible. This message "can inspect." On the other hand, it is displayed as "******" as an object for operators.
[0057] If a test subject does the regurgitation of the exhalation into an exhalation discharge tube in response to this display (step S1), exhalation regurgitation sensing sensor (pressure sensor) 7A will detect the regurgitation of the exhalation concerned, and will output an exhalation sampling start signal (start signal) to an analysis control section.
[0058] Furthermore, in the analysis control section 8, in response to the start signal concerned, a display change signal is outputted to each drops 10A and 10B (step S2), a display output, such as "being under inspection etc.", is performed to drop 10for test subjects A, and, on the other hand, the display "under analysis" is performed to drop 10for operators B. Moreover, with this start signal, the pump for a sampling is started and the sequence control of a series of analysis actuation is started (step S3).
[0059] Analysis is completed, when data processing in the data-processing section 15 is completed, a display change signal is outputted to a drop 10 from (step S5) and the data-processing section 15, and in drop 10for test subjects A, it displays "It can inspect", and, on the other hand, is displayed as "******" by drop 10for operators B.
[0060] Moreover, you may make it display the latency time, as shown in drawing 4 .
[0061] As mentioned above, since the persons concerned, such as a test subject and an operator, can check, according to this example, the situation of an exhalation analysis apparatus of operation becomes [the check of a call of a test subject and the situation of operation of approaching equipment] unnecessary, and it can analyze more efficiently. Moreover, since a status display is returned by the candidate, a situation can be checked to anyone. And all status displays synchronize with existing equipment, and there is no loss of the time amount by time lag for a real-time display.
[0062] Moreover, full automation of exhalation extraction analysis is attained by displaying on the waiting room and the inspection interior of a room.
[0063]
[Effect of the Invention] Since this invention is constituted as mentioned above and functions, in order that according to this it may output the 1st display change signal to a drop when an analysis control section receives a start signal, and a drop may light up or put out the light according to this 1st display change signal, It can indicate by external that the analyzor is working by this lighting or putting out lights. Furthermore, when fixed time amount [control section / analysis] according to a component to be examined passes, the 2nd display change signal is outputted to a drop, and since a drop lights up or

puts out the light according to this 2nd display change signal, analysis can be completed and it can indicate by external that the regurgitation of the next test subject's exhalation is possible. Thus, the outstanding exhalation extraction analysis apparatus which is not in the former which can carry out the display output of being in the condition in which under analysis of an exhalation component and the exhalation regurgitation are possible outside can be offered.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing the configuration of one example of this invention.
[Drawing 2] It is the explanatory view showing the drop for test subjects which is an example of the drop shown in drawing 1 , and drawing 2 (A) is drawing showing the condition under analysis standby, and drawing 2 (B) is drawing showing the condition under analysis.
[Drawing 3] It is the explanatory view showing the drop for operators which is an example of the drop shown in drawing 1 , and drawing 3 (A) is drawing showing the condition under analysis standby, and drawing 3 (B) is drawing showing the condition under analysis.
[Drawing 4] It is the explanatory view showing the drop which displays the standby time which is an example of the drop shown in drawing 1 .
[Drawing 5] It is the block diagram showing the detail configuration of an exhalation extraction analysis apparatus shown in drawing 1 .
[Drawing 6] It is the explanatory view showing relation with the member connected with each port location of the sampling bulb shown in drawing 5 , and it.
[Drawing 7] It is the explanatory view showing the configuration of the Mikata change-over solenoid valve which was shown in drawing 1 , and which is the connection section.
[Drawing 8] It is the explanatory view showing flow, such as an exhalation sample of the 1st mode of operation by the configuration shown in drawing 5 .
[Drawing 9] It is the explanatory view showing flow, such as an exhalation sample of the 2nd mode of operation by the configuration shown in drawing 5 .
[Drawing 10] It is the explanatory view showing the flow of the purge gas at the time of purge processing of exhalation installation tubing by the configuration shown in drawing 5 .
[Drawing 11] It is the sequence diagram showing the configuration of the timing control of an analysis control section of operation shown in drawing 5 .
[Drawing 12] It is the flow chart which shows an example of extraction of the exhalation component in a configuration of having been shown in drawing 5 , and analysis processing.



2 Exhalation Extraction Tubing 7A Pressure sensor 8 Analysis Control Section 10 Drop 14 Analyzor 15 Data-Processing Section